



# ICAO ENGINE nvPM EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: AE3007A2 BYPASS RATIO (-): 4.8  
 UNIQUE ID NUMBER: 01P10AL033 PRESSURE RATIO  $\pi_{co}$  (-): 20.2  
 COMBUSTOR: Type 3 (reduced emissions)  
 ENGINE TYPE: MTF RATED OUTPUT  $F_{oo}$  (kN): 42.2

### REGULATORY DATA

CHARACTERISTIC VALUES:	$LTO_{mass}/F_{oo}$ (mg/kN)	$LTO_{num}/F_{oo}$ (particles/kN)	NVPM MASS CONCENTRATION ( $\mu\text{g}/\text{m}^3$ )
$LTO/F_{oo}$ AND MAX $nvPM_{mass}$	163.0	2.45E+15	343
AS % OF CAEP/10 LIMIT	-	-	3.1
AS % OF CAEP/11 LIMIT (InP)	4.4	11.2	
AS % OF CAEP/11 LIMIT (NT)	17.0	21.3	

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK $nvPM_{mass}$ ( $\mu\text{g}/\text{m}^3$ )
				$EI_{mass}$ (mg/kg)	$EI_{num}$ (particles/kg)	
TAKE-OFF	100	0.7	0.466	48.8	1.97E+14	
CLIMB OUT	85	2.2	0.388	43.8	2.68E+14	
APPROACH	30	4.0	0.138	10.0	2.99E+14	
IDLE	7	26.0	0.055	16.7	5.51E+14	
LTO TOTAL (kg, mg, number of particles)			189	4951	7.44E+16	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				3	3	3
AVERAGE $LTO/F_{oo}$ VALUES (mg/kN, particles/kN)				117.2	1.76E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ( $\mu\text{g}/\text{m}^3$ )				48.8	5.51E+14	267

\* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

### DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% $F_{oo}$ )	CORRECTED EMISSIONS INDICES	
		$EI_{mass,sl}$ (mg/kg)	$EI_{num,sl}$ (particles/kg)
TAKE-OFF	100	53.5	4.22E+14
CLIMB OUT	85	48.9	6.28E+14
APPROACH	30	12.8	1.09E+15
IDLE	7	22.8	2.11E+15

### AMBIENT CONDITIONS

	From	To	FUEL	
BAROMETER (kPa)	98.8	99.9	HEAT OF COMBUSTION (MJ/kg)	43.20
TEMPERATURE (K)	272.8	283.2	HYDROGEN CONTENT (%mass)	13.69
HUMIDITY (kg water/kg dry air)	0.0018	0.0067	AROMATICS CONTENT (%vol)	16.2
			NAPHTHALENE CONTENT (%vol)	0.42
			SULPHUR CONTENT (ppm by mass)	81

MANUFACTURER: Rolls-Royce Corporation  
 TEST ORGANIZATION: MS&T  
 TEST LOCATION: Indianapolis  
 TEST DATES: 23/03/2015-25/03/2015

### REMARKS

1. Certification Report EDNS04000123846